Innovative System Using Low Cost Fabric Filters for Wastewater Treatment in Small Communities

A Thesis Submitted To Faculty of Engineering
Ain Shams University for the Fulfillment
Of the Requirements of M.Sc. Degree
In Civil Engineering

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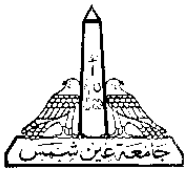

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A Thesis For

The M.Sc. Degree in Civil Engineering
(SANITARY & ENVIRONMENTAL ENGINEERING)

By

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Date: .../…/2017

Dedication

This thesis is lovingly dedicated to

My supportive parents

And to

My wonderful siblings

And finally,
A special dedication to

My lovely fiancée

For her continuous support, and for always being there for me.

STATEMENT

This dissertation is submitted to Ain Shams University, Faculty of Engineering for the degree of M.Sc. in Civil Engineering.

The work included in this thesis was carried out by the author in the department of Public Works, Faculty of Engineering, Ain Shams University, from September 2015 to March 2017.

No part of the thesis has been submitted for a degree or a qualification at any other University or Institution.

The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others

Date : - ---/-- /2017

Signature: - ----------

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ABSTRACT

Name: Mostafa Wagih Tawfik Khalil

Title: Innovative System Using Low Cost Fabric Filters for Wastewater Treatment in Small Communities.

Faculty: Faculty of Engineering, Ain Shams University

Specially: Civil Eng., Public Works, Sanitary & Environmental Eng.

Abstract:-

A pilot plant was constructed in Fayoum governorate, Egypt in order to investigate the efficiency of fabric filters combined with the previously constructed unit (ZECU). In the first phase; the flux rates were changed from 3.5-15 L/m^2/hr and the differential hydraulic head was 1.5 m, average effluent TSS, BOD, CODt and CODs concentrations were 37.4 mg/l, 75 mg/l, 257.22 mg/l and 146.75 mg/l respectively. In the second phase the flux rate was 12 L/m2/hr and differential hydraulic head was changed to be 2.5 m, average effluent TSS, CODt and CODs concentrations were 43.6 mg/l, 133.7 mg/l and 105.3 mg/l respectively. In the third phase fabric filters were tested on the effluent of anaerobic treatment with the same flux rate 12 L/m2/hr and hydraulic head 2.5 m, average effluent TSS, CODt and CODs concentrations were 72 mg/l, 137.5 mg/l and 71 mg/l respectively. The potential removal mechanism for the suspended solids by fabric filters is straining or sieving by filter pores. The potential removal mechanism for dissolved organic matters is dynamic membrane layer formed on the fabric filters surface and was able to remove soluble organic matters with CODs average removal efficiencies of 21.25% 18.9% and 18.9% in first, second and third phase respectively.

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Key Words:

Municipal Wastewater Treatment, Fabric filtration, Non-woven fabric filters, Decentralized Wastewater Treatment.

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